

Patent Claims

1. An arrangement for protection of an electrical device having a pole terminal (4) which is connected to one pole (3) of a battery (1) and to which the device is connected, and having an evaluation circuit (15) which opens a switch (12) as soon as it detects a fault current, characterized in that a protective contact unit (9) is provided, which has a connecting section (10) (which is electrically connected directly to the pole terminal (4)), and a starting assistance contact section (11) which is electrically connected to the connecting section (10) via the closed switch (12).
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- 15 2. The protective arrangement as claimed in claim 1, characterized
 - in that a main line (5) is provided, which leads to at least one second electrical device and is connected to the starting assistance contact section (11),
 - in that the first device is connected to the pole terminal (4), bypassing the main line (5).
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- 25 3. The protective arrangement as claimed in claim 2, characterized
 - in that a current sensor (17) is provided, which senses the current level and/or the current flow direction in the main line (5) and is connected to the evaluation circuit (15) in order to transmit a corresponding sensor signal,
 - in that the current sensor (17) is arranged on the main line (5) in such a way that the starting assistance contact section (11) is located between the current sensor (17) and the switch (12).
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- 35 4. The protective arrangement as claimed in claim 2 or 3, characterized in that a secondary line (6) is

provided, which leads to the first device and is connected to the pole terminal (4) independently of the main line (5).

5 5. The protective arrangement as claimed in one of claims 1 to 4, characterized by at least one of the following features:

- in that the switch (12) disconnects the electrical connection between the starting assistance contact section (11) and the connecting section (10) as soon as a predetermined current is flowing through a control line (13),
- in that the control line (13) electrically connects one control output (14) of an evaluation circuit (15) to the connecting section (10),
- in that the control output (14) in the evaluation circuit (15) is electrically connected via a diode arrangement (16) to an opposing pole (2), which is the inverse of the pole (3) of the pole terminal (4),
- in that the diode arrangement (16) is reverse-biased when connected in the correct direction, and is forward-biased when connected incorrectly,
- in that a start signal transmitter (18) is provided, which produces a start signal during starting and is connected to the evaluation circuit (15) for transmission of the start signal,
- in that the evaluation circuit (15) uses the sensor signal and the start signal to detect whether a fault current is present,
- in that the evaluation circuit (15) drives a switching element (20) as soon as it detects a fault current in the main line (5),
- in that the switching element (20) electrically connects the drive output (14) to the opposing pole (2) in the driven state, bypassing the diode arrangement (16),

- in that the switching element is an MOS driver (20) which has an inverse diode (21),
- in that the diode arrangement (16) in the control line (13) comprises the inverse diode (21) or is formed by the inverse diode (21), and
- in that the diode arrangement (16) comprises the inverse diode (21) as well as at least one further diode connected in parallel with it, in particular a Schottky diode.

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6. The protective arrangement as claimed in one of claims 1 to 5, characterized in that an electrically insulating cover (22) is provided and completely covers the pole terminal (4) except for the starting assistance contact section (11).

7. The protective arrangement as claimed in claim 6, characterized in that the starting assistance contact section (11) has an extension section which projects beyond the pole terminal (4) and/or beyond the pole (3) from the battery (1).

8. The protective arrangement as claimed in claim 6 or 7, characterized in that the evaluation circuit (15) and/or the current sensor (17) are/is arranged within an area which is bounded by the cover (22).

9. The protective arrangement as claimed in one of claims 1 to 8, characterized

- in that the switch (12) is in the form of a relay which switches when current is flowing through the control line (13),
or
- in that the switch (12) is in the form of a pyrotechnic explosive switch which fires when current is flowing through the control line (13).

10. The protective arrangement as claimed in claim 9, characterized in that the control line (13) contains a heating section which is heated when current is flowing through it and fires the explosive switch (12).

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11. The protective arrangement as claimed in one of claims 1 to 10, characterized

- in that the first device is a vehicle power supply system in a motor vehicle, and/or

10 - in that the second device comprises a starter and a generator in a motor vehicle, or is a starter generator in a motor vehicle.

12. Use of a protective arrangement as claimed in one of claims 1 to 11 in a motor vehicle for protection of a vehicle power supply system in the motor vehicle against fault currents when providing starting assistance and receiving starting assistance.